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Comments:
From the SCS Chief

1985 Conservation Provisions Based on RCA

The conservation provisions in the Food Security Act of 1985 are the most dramatic soil and water conservation legislation since the 1930's. The Conservation Reserve Program, swampbuster, sodbuster, and conservation compliance provisions are unique and provide a great opportunity for lasting progress.

Now is a good time to look back at how this legislation came about. Partly, it was an attempt to make the goals of USDA programs more consistent. And partly, it reflected a growing national awareness of the need to protect our resources.

This awareness didn't just happen. It came about for many reasons, including the data and analysis presented in the 1980 appraisal that was carried out under the Soil and Water Resources Conservation Act of 1977 (RCA). The appraisal examined resource conditions and trends and projected resource needs. It was circulated throughout the country, and thousands of people commented on it.

The first Soil and Water Resources Conservation Act (RCA) appraisal and resulting 1982 National Conservation Program have made a big impact on soil and water conservation. Since then, numerous organizations, individuals, members of Congress, and others have taken new interest in natural resource conservation.

The second appraisal includes more and better data on resource conditions, and it projects alternative resource conditions for the next 50 years. USDA and its State and local partners need to look at these projections carefully and consider their implications for soil and water resources.

Early this year, USDA, through the Soil Conservation Service, will begin seeking public comments on the second RCA appraisal. Near the end of this year, we expect to review an updated National Conservation Program based on the second RCA appraisal—a solid base for continuing progress.

Wilson Scaling

Cover: This north-central Montana rangeland is being managed to achieve even grazing and improve and increase the growth of native grasses. (Photo by Tim McCabe, former photographer, SCS, Washington, DC.)

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Looking Ahead with RCA

The public will soon have an opportunity to comment on an appraisal of the Nation's soil and water resources. The appraisal, prepared by the Soil Conservation Service of the U.S. Department of Agriculture (USDA), is the second carried out under the Soil and Water Resources Conservation Act of 1977 (RCA).

The first RCA appraisal, issued in 1981, became the foundation for the National Conservation Program adopted by USDA in 1982 and the conservation provisions of the 1985 farm bill. The second appraisal—drafts of which are currently being reviewed by technical experts within the Department—will be used to establish future policies.

Like the first appraisal, the second appraisal evaluates the condition of the Nation's soil and water resources. But, more than the first appraisal, it also considers implications and addresses three major questions: Are we maintaining the productive capacity of our land? Are we making optimal use of the water available for agriculture? Are we adequately protecting public health and our environment?

The appraisal concludes that degradation of land resources continues, that water demand and supply are not in balance, and that natural processes affected by agricultural production pose possible threats to environmental quality and public health. It also points out that improved management, increased application of conservation measures, and better long-range planning could significantly improve the condition of the Nation's soil and water resources.

For the second appraisal, USDA developed better methods of analysis, collected more information on subjects addressed in the first appraisal, and conducted detailed analysis of issues not studied extensively in the first appraisal. Issues given more study in the second appraisal include off-site erosion damage, nonpoint source pollution, salinity, and estimates of the effects of erosion on cropland productivity.

In addition to analysis of current resource conditions, the appraisal projects alternative future conditions. Commodity demands are projected to increase, and the land and water available for agriculture are projected to decrease. Anticipated developments in agricultural technology, however, will likely mean that the Nation's resources will remain more than adequate to meet projected needs.

Paul D. Barker,
associate editor, *Soil and Water Conservation News*, SCS, Washington, DC

The effects of soil erosion extend beyond the onsite damage it causes. The second RCA appraisal includes information on the off-site effects.

Floods on Canby Creek, Now a Thing of the Past

It was as if no one in Canby, Minn., could recall the past without a certain shudder. There had been too many floods to count, and none of them very pleasant to remember. But now that the town has protected its future against flooding, it is taking a new interest in its past.

Canby was founded by John Swenson, a Norwegian immigrant who came west looking for good land. In 1873, he built three dugouts overlooking what is now called Canby Creek in southwest Minnesota. One dugout was for his wagon, one was for his oxen, and he lived in the third. The next year, he moved a mile downstream and established a store that was the beginning of the community of Canby.

The railroad came, and the settlement grew. Swenson himself served as postmaster and, at one time or another, owned a grain elevator, flour mill, farm implement business, bank, and lumber yard. Before he died in 1914 at the age of 72, Swenson gave the town $1,000 to be left on deposit for 110 years, after which the town can use it any way it chooses.

Life was peaceful enough in the little town. If not for periodic flooding from the creek, there would have been little doubt about the town being around to collect the inheritance from its founder. But the area chosen by Swenson for its good soils is also the focal point of a 28-square-mile watershed. Rainfall and snowmelt flooded the town every spring. More serious floods drove many residents from their homes every 2 or 3 years.

Once out of its banks, Canby Creek would sweep across miles of flat farmland. Several catastrophic floods over the past century nearly devastated the town. Even Swenson's old dugouts were reduced to little more than depressions and a wall line in the ground.

Progress came, but every improvement just seemed to add to what the floods destroyed. Despite sandbagging and other efforts, floodwaters ripped up railroad tracks, roads, and sewerlines. And as more land was cleared upstream for agriculture, the floods got worse.

An award-winning dam by the Soil Conservation Service protects Canby, Minn., (top left) and surrounding farmland from flooding and provides a 155-acre lake for recreation. The dam—on the far side of the lake—makes two bends across the Canby Creek flood plain.

Photo by Denise Nelson, reporter, *Canby News*, Canby, Minn.

In 1957, local residents decided to do something about the flooding. They formed a steering committee that was the beginning of a project to build three flood control structures. The project would take 30 years and cost $4.5 million. When finished in the summer of 1987, it will also provide a recreational lake and a regional park.

Crucial to the project was the availability of Federal cost-sharing funds and technical assistance from the Soil Conservation Service of the U.S. Department of Agriculture under the Watershed Protection and Flood Prevention Act (PL–566). Local support and leadership were provided by the city of Canby, the Lincoln and Yellow Medicine Soil and Water Conservation Districts, and the Lac Qui Parle—Yellow Bank Watershed District.

The city, as one of the main beneficiaries, helped finance the project with a special assessment on all residents. The conservation districts helped landowners in the watershed apply conservation practices such as terraces, conservation tillage, and stripcropping to reduce sediment-carrying runoff. The watershed district, which is made up of representatives appointed by the county commissioners of the three counties involved—Lac Qui Parle, Lincoln, and Yellow Medicine—secured land rights, provided funds for recreational development, and acted as the contracting agent.

"People in the community decided that we finally had to do something about the flooding," said Willis Beecher, one of the watershed district managers. "You could go to bed at night and suddenly hear the roar of a flash flood coming. We decided we shouldn't have to tolerate it when there were ways to fix it."

The engineering challenge was formidable. The average annual rainfall in the area is about 26 inches per year, but since the structures protect a populated area they had to be designed to withstand the most intense rainfall conceivable for the area—about 23.6 inches within 6 hours. As a result, the largest of the three structures is

an earthen dam stretching nearly a mile across the Canby Creek flood plain. The emergency spillway alone, which is 600 feet across and 4,000 feet long, is big enough for a small airport.

From the highest part of the watershed, surface water runoff descends approximately 2,000 feet as it travels the more than 1,500 miles to the Gulf of Mexico. Half of this descent occurs in the first 50 miles on its way to the Minnesota River. The result is an unusual amount of force behind the water arriving at Canby.

Seepage and groundwater also posed problems. Dig down several feet into the underlying glacial till and lake-laid sand and the groundwater bubbles up in what engineers describe as a "near-Artesian" situation. SCS engineers designed special relief wells below the main dam to drain off some of this pressure.

"It looked like an easy site," said Wendell Scheib, construction and soil mechanics engineer for SCS, "but the soils below the surface presented some difficult problems. Thousands of years ago, a large glacial lake left a 20- to 30-foot deep deposit of fine sand that is under natural pressure and is a source of water for Canby and nearby farms. Two subsequent glaciers pushed and gouged their way across the lake leaving an entwined maze of sand, clay, gravel, and boulders across the area. Our challenge was to design and construct a safe dam that would hold recreational water and yet not disturb the natural balance below the dam or add more pressure to the sand."

When the big dam was dedicated last May, most of the town's 2,000 residents turned out. The dam is about a mile from Canby, and its top appears to be about eye level with the town's 90-foot water tower. Behind the dam is a calm 155-acre lake suitable for fishing and swimming. The dam is the largest structure ever built by SCS in Minnesota and was cited by the Minnesota Society of Professional Engineers as one of the Seven Wonders of Engineering in 1986.

"Believe it or not, most of the problems we encountered were people problems," Beecher said, reflecting on the many years he served as contracting officer for the project. "SCS was very good at finding engineering solutions, but we had to have agreement among all the people involved. It took a lot of meetings and discussions—even arguments. We were lucky, I suppose, that we had a good contractor who really cares about soil and water conservation so that most of the arguments were among ourselves. We disagreed at times, but in the end we were realistic enough to get the job done. That's what counts."

Most of the 300 landowners in the watershed actively supported the project. "We asked ourselves how we would like to be treated if it were our land," said Willard Pearson, another watershed district manager. "So we set up appointments for all the landowners to talk to the land viewers—not just us managers—so most of their questions were answered by the people who had the answers. And now that the lake is filled I think they want to do all they can to protect it from sediment. This is one of the cleanest lakes in Minnesota, and there's a lot of pride in it now. It has brought people together."

Nestled just below the dam are the remains of Swenson's long-forgotten pioneer dugouts. They were discovered during construction and fenced off for protection until it's decided what to do with them. There's been some talk of developing them as a historical site once the park is finished.

As for the $1,000 endowment that Swenson left, it's been quietly compounding interest for more than 70 years and will be worth a considerable sum when it matures in the year 2023. Canby plans to be here then. Last spring there was no flood for the first time anyone can remember.

Paul D. Barker,
associate editor, *Soil and Water Conservation News*, SCS, Washington, DC

Flood Control Project Passes the Test

It's late September, and the rain has been falling for 3 weeks. The ground is too saturated to even think about outside work. Yet, Francis McNamara has been out almost every day, smiling and showing visitors around as if these were the sunniest days of his life.

McNamara is a farmer in the Belle Creek Watershed of Goodhue County, Minn. He owns a 160-acre farm on which he runs 50 head of dairy cattle and stripcrops corn and soybeans. But today his pride and joy is a recently completed flood control project.

Other farmers were the first to notice the lakes rising in valleys where there didn't used to be any lakes. Then local officials and the media joined in. "It's working," they said. "Come out and see for yourself. All that work out at Belle Creek is paying off. We've received more than a foot of rain already this month and so far there hasn't been any flooding."

Storms in 1961 and 1978 produced flooding in the watershed that killed livestock and damaged roads, bridges, fences, and crops across 30 square miles. Heavy rainfall severely eroded the uplands and covered the bottom lands with water and sediment. Now, however, excess runoff is collected in five new floodwater retarding structures. These structures store the water in temporary lakes and slowly release it into streams at nonerosive speeds over a number of days. The streams are kept full, but within their banks.

The structures are part of a project sponsored by the Belle Creek Watershed District, the Goodhue Soil and Water Conservation District, and the Goodhue County Board of Commissioners with financial and technical assistance from the Soil Conservation Service under Public Law 83–566, the Watershed Protection and Flood Prevention Act of 1954. SCS's cost for the five flood retarding structures and two grade stabilization structures was

$2.5 million. Landowners within the watershed district provided an additional $400,000 through tax assessment. The project was completed in 1984.

Prior to this project, annual floods damaged 830,000 acres, 5 roads, and 2 bridges. Forty-four thousand tons of sediment were created each year. During the large flooding events, 2,000 acres covering 90 farms, 22 roads, and 12 bridges were affected.

McNamara serves as one of the managers of the watershed district. He has been involved in the project since the first steering committee was formed after the 1961 storm.

"Then in 1978 we got 9 inches of rain," said McNamara, "and it washed out all the bottom land with about 4 feet of water. We've had almost that much rain in the last few days, but the structures are still filling and there's room left for more."

The watershed drains about 82 square miles into the Cannon River, which flows into the Mississippi River on the eastern boundary of the county. For this area, about 6.1 inches of rain in a 24-hour period is considered a 100-year storm—a storm so severe that it is equalled or exceeded an average of only once in 100 years.

"I figure I've been through three 100-year storms in the past 25 years," McNamara said, stopping his 4-wheel drive pickup along a gravel road below one of the structures to observe the water gushing out of a 30-inch outlet pipe. "But this time we were ready. We got it finished just in time."

Paul D. Barker,
associate editor, *Soil and Water Conservation News*, SCS, Washington, DC

West Virginia Flood

Looking Back. . .

The West Virginia flood of November 1985 left a wide path of destruction across urban and rural areas.

The West Virginia flood of November 1985 was the most costly natural disaster in America that year. Thousands of people were still at work a year later repairing the damage.

When the flood restoration is discussed, however, and credits are given and stories told, the outstanding player in this drama was the flood—for record depths of water, for velocity not seen before by anyone living in the State, for destruction beyond belief, and for a recovery effort no one could have anticipated.

Of the 3,711 homes that were flooded, 79 percent were destroyed. More than 150 places of business were destroyed as were 102 highway bridges. At least 47 people were killed, and hundreds more barely escaped with their lives. The flood surged into towns, breaking through doors and windows. People who spent the night of November 4 stranded in trees described oceanlike waves. Communities were isolated.

In the countryside, rivers laid down large trees like matchsticks. Streams lost their channels to massive sediment and rock deposits and flowed across thousands of acres of farmland. Tremendous loads of rock littered crop fields.

From November 1 to 5, as much as 12 to 14 inches of rain fell in the mountains of east-central West Virginia and western Virginia "where rivers are born." The floodwaters went out to Petersburg and Moorefield, Parsons and Rowlesburg, and Greenbank and Marlinton. The flood struck in 29 counties, more than half the State.

Soil Conservation Service State Conservationist for West Virginia, Rollin Swank, called his water resources staff together on November 5, as soon as the enormity of the overnight flooding was known. Five survey teams went out the next day to determine where SCS could assist. Two days later, the first of the contracts to relieve imminent danger was issued.

A year later, SCS was two-thirds finished with the fourth phase of its restoration work. It will complete its fifth and final phase, repair of a thousand landslips on steep hillsides at a cost of $1.25 million, in the summer of 1987.

Altogether, SCS spent $34.5 million on flood restoration. The Federal Emergency Management Agency (FEMA) spent $128 million, the Small Business Administration spent $81 million, and the Federal Highway Administration spent $53.5 million. In addition, other Federal and State agencies and many private assistance organizations, including the Salvation Army and Red Cross, strained their budgets and personnel to the breaking point.

The job of SCS in the beginning was to reroute renegade rivers out of people's houses, yards, and fields, and to relieve the worst of stream blockages. The first phase lasted 6 weeks, took place in 19 counties, and cost $2.34 million. Along with restoring streams to channels, SCS employees helped to locate suitable sites for the mass burial of thousands of drowned cattle, chickens, and turkeys.

Thousands of tons of debris remained. During the first 5 months of 1986, SCS issued and administered contracts costing $22 million in 15 counties. Supervised by SCS employees from West Virginia and eight other States, the contractors disposed of floatable debris, restored streams to channels, rebuilt low-head dikes, used rock from fields to stabilize streambanks, and seeded more than 5,000 acres of disturbed land. Inspectors and contractors worked 6 days a week, 10 hours a day, often in severe weather.

The first and second phases involved 133 contracts and 181 purchase orders, all renting equipment with operators.

In the fourth phase, $5.7 million was spent on contracts for repairs in 13 counties. Major river blockages were removed, and streambanks stabilized. Unlike the first two phases, where EWP and congressional deadlines prohibited detailed design planning, the fourth phase was formally designed. Contracts were bid on a job basis rather than by equipment rental.

Unlike the other four phases, the third phase was not financed and managed by SCS. FEMA gave the Potomac Valley Soil Conservation District, which includes five counties hardest hit by the flood, $1.3 million to repair watershed structures. Twenty-two lake dams filled with runoff, as they were designed to do in a 100-year storm, and overflowed emergency spillways, 16 of which required repair. SCS designed the repair projects. Throughout the flooding no dams failed. The 75 flood control dams in the Potomac headwaters successfully held back 10 billion gallons of extra water.

The restoration effort was not without controversy. Some landowners needed and wanted more farmland restoration done than is permitted under Section 403 of the Agricultural Credit Act of 1978. A few town residents sought new flood prevention measures, also not permitted. On the other hand, some said SCS did too much to stream channels.

"The stream channels were destroyed by the flood, not by SCS," Swank said. "I think the care we took is evidenced by the quick recovery of the fisheries. By the end of the summer following the flood, biologists reported they were 'astounded' by the numbers and variety of fish in the streams."

Victims of the flood suffered greatly as they tried to cope with their losses. Bob Ensor, SCS area conservationist in the Potomac headwaters, said victims benefitted "from our being in there and doing something to help them restore their lives." Even serving as an outlet for them to express their frustrations "has been a big factor," Ensor said.

Last January, as SCS employees began the huge and delicate task, Swank told them, "It's a time when we must work hard and intelligently to earn again our pride in conservation and public service." He's happy with the results.

Jim Thorn,
public affairs specialist, SCS, Morgantown, W Va.

Looking Ahead. . .

As a result of the November 1985 West Virginia flood, the Soil Conservation Service and the National Weather Service (NWS) are designing and implementing an automatic flood warning system for the South Branch River which flows through the State's eastern panhandle.

SCS received $100,000 in fiscal year 1987 under the Flood Control Act of 1944 (Public Law 78-534). The Potomac headwaters is one of the 11 major river basins named in the law.

The Water Resources Planning Staff is doing detailed valley cross-sections and mapping at towns from the headwaters down river to Petersburg. That includes Circlesville, Riverton, and Franklin.

SCS will do hydrologic calculations, and NWS will locate and help the State install computerized devices to measure rainfall and stream levels.

Then both will help the Potomac Valley Soil Conservation District and county and local governments develop emergency response and public involvement plans.

Private Businesses Help Promote Improved Irrigation

"We think we're all by ourselves," says Grant Linder, "but we aren't. Businesses are willing to help. All we have to do is ask."

Linder, Soil Conservation Service area resource conservationist at Grand Island, Nebr., is referring to a large-scale project to improve irrigation water management in central Nebraska. The approach centered on demonstrations of semi-automated furrow irrigation systems with the involvement of private businesses; the Central Platte, Lower Big Blue, and Upper Big Blue Natural Resource Districts; the Cooperative Extension Service; and SCS.

"Word of failure gets around much faster than word of success," says SCS area engineer Steve Moran. "Industry leaders know it costs less to donate or lend equipment for a demonstration than to advertise, so they are anxious to help sponsor a successful demonstration. Getting industry involved lets us reach more farmers." Industry involvement also enhances the credibility of a demonstration.

One business that is involved is Diamond Plastics, Corp. The company donated exhibitor space and loaned pipe to demonstrate "cablegation" and surge irrigation systems at the 1985 and 1986 Husker Harvest Days, an annual 3-day working farm show in Grand Island that attracts more than 250,000 people. Diamond Plastics has also loaned pipe for onfarm demonstrations.

The cablegation technique uses a plug—called a "pig"—that fits snugly inside a pipe at the high end of a carefully graded field. As the pig moves through the pipe, it backs up water behind it, forcing the water through holes in the pipe, into the furrows, and down to the lower end of the field. The pig travels to the end of the pipe every 5 to 7 days. Surge irrigation uses periodic heavy flows of water through gated pipe for even application.

"We're glad to help demonstrate these techniques, partly because they give our product some visibility," says Lawrence Whitely, ag division manager of Diamond Plastics, Corp. "But there's another reason, too. Both cable and surge irrigation systems reduce water use, so the water that is applied to the field stays within the root zone. The nitrogen that farmers put down in fertilizers is taken up by the crop before it leaves the root zone or reaches the groundwater. This is important. Groundwater quality is a hot issue in the State."

At a cablegation irrigation demonstration site at Grand Island, Nebr., Steve Moran, SCS area engineer (in foreground), discusses how the irrigation system works with SCS district conservationists, Dick Hayes from the Clay Center field office (at left) and Scott Willet from the Osceola field office.

All natural resource districts in Nebraska are required by law to develop groundwater quality plans. "Overapplication of irrigation water leaches nutrients into the water table," says Milt Moravec, projects manager of the Central Platte Natural Resource District (NRD). "Everybody knows this. And any number of studies have shown that irrigation water management and nitrogen management can reduce contamination of groundwater."

Cablegation and surge irrigation methods not only improve water quality, they save water and reduce pumping costs. Most irrigators also like the fact that these systems require less labor than most surface irrigation systems. "That leaves more time for management," says Moran.

However, irrigators are not likely to purchase equipment and change to an unproven irrigation method without being pretty certain it will work for them and their operation. To help convince them, the Central Platte NRD bought a cablegation box and helped install a cablegation system as a demonstration on Grand Island farmer Gregg Robb's land.

"If somebody doesn't try new methods, nobody will ever make any progess," says Robb. "Sure, I was glad to let SCS set up the demonstration on my field. But farmers don't just want to see it, they also want to talk about it with me one-on-one. I know this demonstration was a success because so many of my neighbors came back and talked to me about it some more."

This year, Linder and Moran set up 19 demonstration fields in their area. They included 7 cablegation and 12 surge irrigation systems. Other SCS offices have begun using the approach that Linder and Moran pioneered in the Grand Island area. The SCS staff in the Nebraska panhandle area used the same approach in promoting surge irrigation and cablegation there, with promising early results.

"We used this approach in our irrigation water management program," says Linder. "And we know that similar approaches have already worked in conservation tillage. Now, when we start a project, our first question is, 'How can we involve business and industry?' Their involvement adds momentum to our efforts and helps to guarantee success."

James N. Benson,
former writer-editor, Public Information Staff, SCS, Washington, DC

Skategate Rolls Down Irrigation Costs

Some farmers in Colorado are using an irrigation ditch check that moves on rollerskate wheels. It's called a skategate.

It was developed by two members of the Soil Conservation Service field staff at Grand Junction, Colo., Chuck Malone, a soil conservationist, and Don Torline, a conservation technician. The skategate incorporates features from other irrigation systems into one that's especially suited to fields with ditches on less than four-tenths of 1 percent slope.

"Most automatic and semi-automatic furrow irrigation systems require at least four-tenths of 1 percent slope or more," says Malone. "That leaves farmers who have irrigation headditches flatter than that with few alternatives. The skategate method enables these farmers to have a semi-automatic system that uses less time, water, and labor to irrigate and gives more even water application."

Another reason for Malone and Torline's interest in helping farmers increase their irrigation efficiency is their location in the Grand Valley Salinity Control Project area where excessive salts leaching through the soil profile contribute to salinity problems in the Colorado River. Said Malone, "If farmers can get better control on the amount of water applied and the length of time it is applied they can do a better job of reducing the amount of salts leaching from the soil."

The skategate uses no external power or clocks. A ditch check, or gate, on wheels is attached to a rope wound around a drum on a braking wheel. Water pushes the gate down the ditch at a rate controlled by the braking wheel. Water fills the ditch upstream of the gate and flows out ports in the ditch. As the gate continues to move down the ditch the water level drops below the ports.

Installation of a skategate system is simple and relatively inexpensive. Starting with a standard concrete irrigation ditch, holes 2 inches in diameter are drilled along the field side and polyvinylchloride (PVC) discharge tubes with adjustable ports are installed. The adjustable ports are used to even out the time it takes the water to reach the end of the field in different furrows. Soil differences can cause the water to move faster or slower than the field average. The holes for the ports are drilled on the same constant grade as the ditch and are all the same distance from the top of the ditch.

This irrigation ditch check, called a skategate, is especially suited for use in fields on less than four-tenths of 1 percent slope. The moving check forces water out the ports in the field side of the ditch.

The same skategate can be used with similar sized ditches on different fields. The frame and gate are made from channel, box, and sheet aluminum. The gate for an 18-inch-deep ditch weighs about 40 pounds, light enough for one person to pick up. Polyethylene skate wheels are attached to the gate and adjusted to the sides of the ditch, preventing the gate from catching on port adjusters. The weight of the gate is borne mainly on the set of wheels that ride on the ditch lip. Skategates for a standard size irrigation ditch cost about $400.

The gate, built and installed on approximately a 60-degree angle, uses the weight of the water to hold it down. This prevents any floating or climbing out of the ditch. A rubber seal is installed between the aluminum gate and the concrete ditch wall.

When irrigating, the gate is started at a point about one-third of a set width across the field. An adjustable, automatic, counterbalanced overflow lets excess water go on down the ditch. This water is not wasted, but is checked at the lower end of the field to pre-irrigate rows at the far end. When less water comes in, the skategate automatically slows its travel rate until normal flow resumes.

When the skategate reaches the far side of the field, it stays there until the water has run the desired length of time in the rows. The skategate can then be lifted out of the ditch and the water allowed to flush out any silt or debris. A snaphook attaches the gate to the control rope, so it is easy to free the gate and move it back to the start, or to another field. The rope is rewound onto the drum with a crank and the system is ready to start over.

The skategate is pushed down the ditch by the irrigation water, but the speed is controlled by a water wheel brake, developed by the U.S. Department of Agriculture's Agricultural Research Service (ARS). The brake is made of 4- to 8-inch diameter PVC pipe, depending on the resistance required. The pipe is assembled into an octagon, using elbows, with two or three chamber partitions. Valves permit flow between the chambers which are partially filled with water, saline solution, or antifreeze.

The pull of the skategate turns the wheel, which can only rotate as fast as the fluid moves from one chamber to the next.

Opening or closing the valves controls the rate of wheel rotation and, therefore, the rate the skategate moves down the ditch. Average speed is 1 inch per minute. A water wheel brake costs approximately $500 to build and install. Other type braking systems are available.

In the fall of 1983, Jim Fry and his son, Glen, who farm about 6 miles west of Grand Junction, Colo., installed the first skategate as part of a cooperative effort among several U.S. Department of Agriculture agencies. The Agricultural Stabilization and Conservation Service provided cost sharing through the Agricultural Conservation Program. ARS assisted with the wheel braking system. SCS provided engineering and design assistance, and the Cooperative Extension Service provided engineering assistance as well as a sign to mark the test site and acknowledge those participating in the project.

When asked what he thought of the skategate system after using it for two seasons, Jim Fry said, "It sure saves time, work, and water. I'd put in another skategate system if I had a field that was right for it." What is right is a field that is reasonably square and has a straight headditch with a slope of less than four-tenths of 1 percent.

Jerry Schwien,
public affairs specialist, SCS, Denver, Colo.

Going, Going, Saved

Up on the block went another 608 acres of New Jersey's dwindling supply of prime farmland. But when the final bid was in and the auctioneer rapped his gavel, most of the residents of Chesterfield Township gave a sigh of relief. As part of the State's first Agriculture Retention Area, this land will remain in farmland permanently.

For a while, it had seemed as if the barley-covered fields behind the old schoolhouse in Chesterfield were destined for development. In place of five family farms, developers had proposed building more than 1,000 high-density housing units.

Because of sewage requirements, the developers were unable to get a permit for the project. Most residents, however, were still concerned that the land might one day be developed. Chesterfield contains some of the best farms and the smallest population in Burlington County. The residents felt that development of this land would result in large buildings, congested streets, and overburdened schools and utilities in their rural community.

To keep the land in farms, township and Burlington County officials purchased the tract from the developers for $1.95 million, attached an easement to the deed that prohibits any nonagricultural development, and resold the land at auction for just over $1 million.

The auction was held June 8, 1985, at the firehouse in Chesterfield Township. Had it not been for a new State program that pays up to half the cost of purchasing development easements on qualifying farmland, the cost of the easement to the township and county would have been the difference between what the farmland cost and what it was sold for, about $950,000. Three days before the auction, however, Governor Thomas H. Kean presented township and county officials with a check for $412,650, reducing the net cost to the township and county to less than $500,000.

The New Jersey program began in 1981 with the passage of the Farmland Preservation Bond Act, which authorized the sale of $50 million in bonds. The Agriculture Retention and Development Act of 1983 authorized the State Department of Agriculture to use the money to provide grants for acquiring development easements on farmland and for cost sharing soil and water conservation projects.

Under the 1983 law, landowners who voluntarily participate in farmland preservation programs approved by the County Agriculture Development Board can apply to the local soil conservation district for cost sharing on soil and water conservation practices. In addition to cost-sharing funds, the landowners receive other benefits that include protection against zoning changes, eminent domain takings, emergency water and energy restrictions, and nuisance complaints. In return, the landowners agree to keep their land in farming for at least 8 years and maintain the conservation practices for a specified period. The land must be covered by a conservation plan prepared by the U.S. Department of Agriculture's Soil Conservation Service and approved by the local conservation district.

"Since Burlington County became the first of the State's 21 counties to establish an Agricultural Retention Area it has become a model for other communities planning to preserve valuable farmland," said Arthur R. Brown Jr., secretary of the New Jersey Department of Agriculture. "This is needed," he said, "especially in New Jersey, where there are increasing pressures from developers and rising property values."

Barbara L. Maus,
public affairs specialist, SCS, Somerset, N.J.

News Briefs

Illinois Inventories Urban Flood Damage

An inventory of urban flood damage in rural and metropolitan communities throughout Illinois is helping State and Federal agencies provide flood studies and flood damage reduction plans where the need is greatest.

The Soil Conservation Service conducted the inventory from 1983 to 1986 at the request of the Illinois Department of Transportation's Division of Water Resources (DWR). The inventory identifies those communities with flooding, drainage, or other water-related problems and estimates the average annual dollar value of urban flood damage by community and by county. It also identifies existing flood plain studies, flood insurance studies, and other engineering studies of flood plains.

SCS began the inventory by collecting available data from flood plain study reports prepared by several Federal, State, and local agencies and private consultants. The water resources planning staff at SCS State headquarters entered the existing data on standardized survey forms for each community. SCS district conservationists in each county then updated these forms with the help of community leaders.

Each survey form provided the following data:

- Type of flood study completed and the date completed;
- Status of flood insurance;
- Causes of local flood problems;
- Status of flood plain development and community growth potential;
- Specifics about past major flood events, including an economist's estimate of damage to homes, commercial and industrial buildings, roads, bridges, and other structures; and
- Local interest in flood plain studies.

SCS's water resources planning staff for Illinois compiled the data and determined the average annual value of damages in constant dollars. If the available data for a community were inadequate for making a dollar estimate of flood damage, an SCS engineer or engineering technician made a limited reconnaissance study of the community to delineate the 100-year flood plain and to estimate property damage.

DWR updates the inventory as new and revised flood plain studies are completed. SCS, DWR, and other State and Federal agencies use the inventory to designate target communities for flood plain studies and flood management programs.

Keith Donelson,
staff leader, water resources planning staff, SCS, Champaign, Ill.

Ridge-Tillage Up in Corn Belt

Ridge-tillage was up nearly 10 percent last year in the Corn Belt.

According to the National Association of Conservation Districts (NACD), the total number of ridge-tilled acres in the Corn Belt States increased from 705,470 in 1985 to 774,579 in the spring of 1986. These totals are based on nationwide surveys conducted by NACD's Conservation Tillage Information Center (CTIC).

CTIC recorded increases for all ridge-tilled crops in the region: corn, soybeans, grain sorghum, and small grains. Corn Belt States are Ohio, Indiana, Illinois, Iowa, and Missouri.

According to R. Donald Moore, farm management specialist for the Extension Service in Ohio, ridge-tillage is increasingly regarded as an economical method of tilling heavy, poorly drained soils. Compared to conventional tillage, ridge-tillage allows earlier planting on dry, warmed-up ridges, reduced herbicide usage, and fewer trips across the field.

The CTIC previously conducted tillage surveys once a year and published the results in February. In 1986 the CTIC began conducting surveys twice a year to record spring and fall planting practices, with publication in September and February.

Soil Researcher Receives Bennett Award

The Soil Conservation Society of America (SCSA) recently presented its 1986 Hugh Hammond Bennett Award to William C. Moldenhauer, professor emeritus of agronomy, Purdue University. Moldenhauer is a retired supervisory soil scientist and research leader, National Soil Erosion Laboratory, Agricultural Research Service, U.S. Department of Agriculture, West Lafayette, Ind.

The Bennett Award, named after the first chief of the Soil Conservation Service and a founder of SCSA, is the Society's most prestigious award. It is given to one person each year in recognition of distinguished service and international accomplishments in land and water resource conservation.

Moldenhauer was cited for his contributions to soil erosion research. The National Soil Erosion Lab was initiated, designed, and completed under Moldenhauer's leadership. Although literature on soil erosion is extensive, the lab addresses fundamentals for which little or no precedent exists. In many cases, research relationships developed there by Moldenhauer became the first data available.

Highlights of Moldenhauer's efforts include work on the effectiveness of soil conditioning and stabilizing materials; soil clod resistance to breakdown; surface sealing and erodibility under simulated rainfall conditions; and effects of surface residue, surface roughness, and compaction on soil erosion.

Moldenhauer's research on the nutrient-carrying capacity of eroding materials increases in significance as the literature linking soil erosion and water quality expands. Other research by Moldenhauer has proved essential in the development and refinement of the universal soil loss equation, used by field scientists to estimate soil erosion.

SCSA is a private, nonprofit organization dedicated to advancing the science and art of good land and water use. It has 13,000 members in the United States, Canada, and 80 other countries.

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AgEvents 1987

March	15–21	National Wildlife Week
	20	National Agriculture Day
April	22	National Arbor Day
	26–May 2	National Volunteer Week
	26–May 2	Keep America Beautiful Week
May	6–7	International Land, Pasture, and Range Judging Contest
	24–31	Soil Stewardship Week
June	5	World Environment Day
September	12	Public Lands Day
	20–26	National Farm Safety Week
	26	National Hunting and Fishing Day
October	5–9	National 4–H Week
	16	World Food Day
November	20–26	National Farm City Week

New Publications

Research for Tomorrow, 1986 Yearbook of Agriculture

by the U.S. Department of Agriculture

Featured in the 344-page yearbook are articles written for lay people about research in biotechnology, insects, weeds, and forests; modern ways to transfer scientific knowledge to its potential users; human nutrition; and careers in agriculture.

Authors include scientists in USDA and throughout the Land Grant University system, as well as USDA policy makers and administrators.

Copies of the yearbook are available for $9.50 each from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Recent Soil Surveys

Published by the Soil Conservation Service

Alabama: Monroe County.
Arkansas: Cleburne and Van Buren Counties.
Georgia: Baker and Mitchell Counties.
Idaho/Nevada: Duck Valley Indian Reservation.
Illinois: Madison County.
Iowa: Delaware County.
Kentucky: Mason County and Washington County.
Massachusetts: Dukes County.
Mississippi: Choctaw County.
Nebraska: Fillmore County and Johnson County.
New Mexico: De Baca County.
North Carolina: Chowan and Perquimans Counties.
North Dakota: Ramsey County.
Pennsylvania: Cumberland and Perry Counties.
Virginia: Greene County.
Wisconsin: Langlade County.

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